

were considered to constitute a fertile soil ; the compound was well watered and planted with several vegetables ; they however would not thrive till the water was changed for the drainings of a dunghill. Plants have been placed in a variety of substances, as sulphur, pounded glass, &c., and carefully moistened with distilled water ; in this state they have existed for some time, but it is beyond all experience to suppose, that, in such a condition, they should perfect the several functions required of them by nature. It is only by a proper supply of organized matter in the soil that vegetation can proceed with vigour ; some portion of this is supplied by animals, but by far the greater and more important is yielded by plants, which is thus returning to the form and uses from which it had previously issued.

Every year brings in the alternation of its seasons changes in the vegetable kingdom ; as soon as spring has set in new life is given to every herb and shrub, the buds unfold, developing flowers and leaves ; the former soon fade and fall, in time the fruit follows, and towards the end of summer the rising winds drive the leaves in clouds from the trees. Heavy rains now succeed, and the broken branches, portions of shed bark and other vegetable remains, the refuse of the autumn, are soon saturated with moisture and hasten to decomposition. In countries with excessively moist climates the quantity of fallen vegetation is immense ; large trees, the noblest members of the forest, sinking under the effects of a continually moist atmosphere, literally lie in tiers, and give a footing, though often a treacherous one, for hundreds of yards without it being necessary to touch the soil. A portion of this decaying matter is dissolved by the rain-water, and penetrating the earth carries nutriment to the roots against the demands of the ensuing spring. What remains gradually mixes with the mineral constituents of the soil, and more slowly becomes subservient to the same end.

[To be continued.]

LII.—*Excerpta Botanica, or abridged Extracts translated from the Foreign Journals, illustrative of, or connected with, the Botany of Great Britain.* By W. A. LEIGHTON, Esq., B.A., F.B.S.E., &c.

No. 10. *Revisio Tiliarum.* Auctore EDUARDO SPACH. (Ann. des Sc. Nat. vol. ii. n. s. p. 381.) [So far as respects our British species.]

TILIA, Linn.

Arbores, comâ subrotundâ vel ovali, densissimâ. Cortex interior flexilis, tenax. Lignum lave. Ramuli sæpè ab autumno ad ver

purpurascentes vel sanguinei. Gemmæ axillares, squamosæ. Pubescens: centia sparsa vel stellato-tomentosa.

Folia alterna, disticha, petiolata, simplicia, indivisa (nonnunquam angulosa, in varietatibus quibusdam pinnatifida vel palmata), serrata, acuminata, plerumque subrotunda, inæquilateralia, basi obliquè cordata truncatave et palmato- 4-7-nervia, subtùs ad venarum axillas barbata; petioli teretes, basi et apice incrassati, sæpè graciles ac laminâ subæquilongi. Stipulæ geminæ, caducæ. Folia cotyledonea palmatifida.

Flores umbellati vel corymbosi, vel sæpius trichotomè cymosi, odrati; pedunculi ad petiolorum latus exterius solitarii, graciles, penduli, supernè deflexi, infernè costæ bracteæ chartaceæ reticulatae lingulatæ adnati*; pedicelli ebracteolati, stricti, apice dilatati, infernè glandulis verruciformibus sparsis instructi.

Sepala 5, libera, reflexo-patentia, decidua, concava, obsoletè trinervia, sericea, vel tomentosa, intùs basi subbarbata et foveolâ meliferâ instructa, æstivatione valvatâ.

Receptaculum pentagonum, brevissimum, ferè planum, nectario tenuissimo obtectum.

Petala 5, hypogyna, libera, sepalis alterna, subspathulata, concava, albida, vel lutescentia, tenuè venosa, vesiculis multis diaphanis (oleo essentiali repletis) adspersa †, sub anthesi erecto-conniventia, demùm elongata, distantia, subpatentia.

Stamina 25—80, hypogyna, pluriseriata, decidua. Filamenta libera, vel basi irregulariter polyadelpha, filiformia, albida, sæpè apice bifurca, æstivatione recta, subimbricata, ante anthesin flexuosa, demùm divergentia. Antheræ luteæ, thecis 2 rimâ longitudinali dehiscentibus, medifixis, discretis, plùs minùsve divergentibus.

Staminodia (petala interiora) 5 (in quibusdam speciebus nulla) petalis anteposita et subconformia at minora, filamentorum basi adnata, æstivatione staminibus interiore.

Pistillum: ovarium sericeum vel tomentosum, subglobosum, 5-loculare: loculis biovulatis. Ovula superposita, angulo centrali appendentia. Stylus indivisus, teres, erectus, basi articulatus, post anthesin accrescens plus minusque exsertus, demùm deciduus. Stigmata 5, brevia, dentiformia, triquetra, sub anthesi arcte conniventia, demùm erecto-divergentia vel patentia †.

Pericarpium: nux lignosa (in specie unicâ chartacea), subpisiformis, 5-costata (costis nonnunquam demùm evanidis), evalvis, abortu unilocularis, 1- vel rarò 2-sperma.

Semen placentæ demùm parietali hilo lineari mediante adnatum, obovoideum, basi attenuatum. Epispermum crustaceum, rufescens. Chalaza apicilaris, mammiformis. Perispermum corneum, oleosum. Embryo rectus, medianus, longitudine perispermii, recens viridis:

* Pedunculi, quum manibus distenduntur, strepitu rumpunt peculiari.

† His procul dubio tribendum florum odor fragrantissimus eorumque virtutes stimulantes; bracteæ pedunculi sepalaque autem mucilagine copiosâ scatent.

‡ Characteres specierum e stigmatorum directione desumti fallacissimos esse, pro certo habemus.

radicula oblongo-clavata, elongata, infera, per germinationem e nucis basi circumscissa excrescens; cotyledones foliaceæ, subcordatæ, flexuosæ, pennato-5-lobatae: lobis inæqualibus, subconvolutis.

§. Staminodia nulla. Stamina 25-45, petalis longiora, stylum etiam post anthesin superantia; filamenta vix apice bifurca, basi nunc libera, nunc pentadelpha: phalangibus 5-8-andris, petalis antepositis, cum filamentis 1-3 liberis alternantibus. Nux aut chartacea, fragilis, costis filiformibus, aut lignosa, costis prominulis.

Species omnes Europæ incolæ.

A. *Folia (præter barbulas paginæ inferioris) petiolis ramulisque glabra.*
a. *Nux obliqua, chartacea, fragilis: costis filiformibus, tomento flocoso nonnunquam absconditis.*

TILIA SYLVESTRIS, Desfont.—T. foliis e basi obliquè cordata v. dimidiato-cordata, v. truncata, v. rotundata orbicularibus v. subrotundis, v. transversè ellipticis, v. ovatis, v. ovato-ellipticis, cuspido-acuminatis, inæqualiter serratis, suprà obscurè viridibus, sublucidis, subtùs glaucis, barbatis; petiolis foliorum superiorum laminâ subæquilongis v. dimidio usque brevioribus; pedunculis 2-9-floris (plerumque 7-floris); nuce obovatâ v. ovato-globosâ, umbo-natâ.—*Tilia sylvestris*, Desfont. Cat. Hort. Par.—*T. parvifolia*, Ehrh.—Borkh.—Eng. Bot. t. 1705. Schk. Handb. t. 141. Hayn. Arzn. iii. 46. Guimp. et Hayn. Deutsch. Holz. t. 106.—*T. microphylla*, Vent. Diss. t. 1. fig. 1.—*T. europaea*, γ. Linn.—*T. ulmifolia*, Scopol.—*T. europaea borealis*, Wahlenb.

Præ cæteris varietatibus sequentes insigniores, characteribus in singulis individuis satis constantibus, transitu tamen uniuscujusque in alteram facile recognoscendo.

Var. a. *ovalifolia* sive *minor*.—Foliis minoribus ($\frac{1}{2}$ -2 pollices longis, 10-15 lineas latis), e basi truncatâ v. rotundatâ valdèque obliquâ subovatis: ramulorum floriferorum summis vix petiolo longioribus sive isto paulo brevioribus.—[Hospitatur in Horto Parisiensi ubi *Tiliæ sylvestri rotundifoliæ* mense ferè præcocius, medio Junio nempè florescit.]

Var. β. *cordifolia* sive *major* (*Tilia parvifolia*, Guimp. et Hayn. l. c.).—Foliis majoribus (3 pollices circiter longis, $2\frac{1}{2}$ pollices latis), cordatis v. cordato-ovatis, basi plus minusve obliquis: ramulorum floriferorum summis plerumque petiolo longioribus.

Var. γ. *rotundifolia* (*Tilia microphylla*, Vent. l. c.).—Foliis 1-3 pollices latis, latitudine plerumque brevioribus, subæquilateralibus, e basi cordatâ subrotundis: serraturis sæpissime latis rotundatis; petiolis foliorum summorum laminâ nunc subæquilongis, nunc dimidio brevioribus. [Formæ hoc spectantes in Galliâ cæteris vulgationes videntur.]

Arbor altitudinem 80-pedalem diametrumque 6-pedalem attingens. Cortex truncorum vetustorum rimosus, e fusco nigricans, juniorum et ramorum lævigatus, olivaceus. Ramuli annotini viridescentes, vel lutescentes, vel rubelli. Rami patuli, comam conico-pyramidalem efformantes. Gemmæ ovatae, obtusæ, incurvæ, rufescentes. Foliorum

lamina 1–3 pollices longa, nunc longitudine æquilata, nunc angustior, basi 5- v. 7-nervis, membranacea, subtùs in axillis nervorum lanâ floccosâ rufescente vel lutescente barbata; serraturæ triangulares vel rotundatae, plus minusve approximatae, vel distantes, inæquales vel subæquales, mucrone brevi, cartilagineo, albido, nonnunquam apice calloso mucronatae; petiolus gracilis, 6–24 lineas longus (foliorum infimorum semper lamina brevior). Pedunculi plerumque folio paulo longiores (semper petiolo longiores); bractea lanceolata, v. lanceolato-oblonga, apice rotundata v. attenuata, flores superans pedicellisve superata, nunc usque ad basin pedunculi decurrentes, vel ab eâ plus minusve remota; pedicelli umbellati, v. corymbosi, v. trichotomè cymosi, pedunculi parte liberâ nunc longiores, nunc breviores. Sepala vix ultra 2 lineas longa, oblongo- v. ovato-lanceolata, obtusiuscula, subtùs glabra v. pulverulenta, supra sericeo-tomentosa. Petala $2\frac{1}{2}$ –3 lineas longa, lanceolato- v. oblongo-spathulata, obtusa, albida, apice obsoletè crenulata. Stamina 25–30, libera (an semper?), petalis demùm dimidio longiora. Ovarium sericeo-tomentosum. Stylus glaber, post anthesin staminibus vix superatus. Nux pisi minoris volumine, tenuis, fragilis, tomento rufescente, floccoso, demùm deciduo induta, immatura turbinata v. pyriformis.

Habitat in Europâ ferè totâ, præsertim borealiori, necnon in montibus Uralensibus ac Caucasicis, inque Siberiâ Australiori (v. v. c. et sp.).

b. *Nux coriacea, subæquilateralia: costis prominulis.*

TILIA INTERMEDIA, DeC.—T. foliis e basi subæqualiter v. obliquè cordata v. dimidiato-cordata, v. truncata, v. rotundata subrotundis, v. ovato-subrotundis, v. ovatis, cuspidato-acuminatis, inæqualiter serratis, supra lætè viridibus, subtùs pallidioribus (vix glaucis): summorum petiolo lamina dimidio—duplo breviore. Pedunculis 2–7-floris; nuce subturbinatâ vel obliquè obovatâ, umbo-natâ, velutinâ.—*Tilia intermedia*, DeC. Prodr.—*T. europaea*, Smith, Eng. Bot. t. 610. Svensk, Bot. t. 40. Flor. Dan. t. 553.—*T. vulgaris*, Hayn. Arzn. iii. tab. 47. Guimp. et Hayn. Deutsch. Holz. t. 107.—*T. Teckiana*, C. Bauh.

Arbor 40–60 pedalis ultraque. Cortex vetustior nigricans, rimosus. Rami divergentes, suberecti, comam pyramidalem vel conico-pyramidalem efformantes. Ramuli annotini olivacei vel lutescentes. Gemmæ ovatae, subcompressæ, lævigatae, olivaceæ vel purpurascentes. Foliorum lamina 2–3½ pollices longa, 18–45 lineas lata (folia surculorum sterilium usque ad 4½ pollices lata totidemque longa), membranacea, basi 5- v. 7-nervis, supra lævigata, subtùs in venarum axillis lana floccosa dilutè fulva v. lutea, v. castanea barbata; serraturæ triangulares, v. rotundatae, plus minusve inæquales, mucrone brevi cartilagineo sæpè apice sphacelato acuminatae; petiolus 6–20 lineas longus, gracilis. Pedunculi foliis ferè æquilongi, vel paulo breviores, plerumque 4–7-flori; pedicelli parte liberâ pedunculi subæquilongi, vel paulo breviores, umbellati, vel corymbosi, vel dichotome sive trichotome cymosi; bractea lanceolata, v. lanceolato-oblonga, subobtusa, plerumque usque ad basin pedunculi decurrens. Sepala ovato- v. oblongo-lanceolata, obtusiuscula, suprà glabra, sub-

tus marginibusque tomentosa, $2\frac{1}{2}$ lineas longa, lanceolato- v. oblongo-spathulata, obtusa, apice obsoletè crenulata, pallidè straminea. Stamina 30-35, basi irregulariter pentadelpha (secundùm cl. Hayne libera). Ovarium sericeo-tomentosum. Stylus glaber, post anthesin staminibus subæqualis. Stigmata obtusa, margine denticulata, post anthesin nunc arrecta, nunc patula. Nux 3-4 lineas alta, diametro $2\frac{1}{2}$ -3-lineari, sublignosa, pentagona, tomento floccoso lutescente induta, demùm glabrescens. Semen obovoideum, castaneo-fulvum.

Habitat in Europâ mediâ et boreali; specimina Gallica spontanea haud vidimus; hospitatur autem in hortis ac arboretis, e. g. circa Parisios in ambulacris sylvæ *Bois de Boulogne* dictæ.

B. *Nux lignosa* : *costis valde prominulis*. *Ramuli juniores, petioli ac foliorum pagina inferior plus minusve hirti*.

TILIA MOLLIS, Spach.—T. foliis e basi cordata, v. dimidiato-cordata, v. rotundata, v. truncata orbicularibus, v. subrotundis, v. ovato-subrotundis, v. ovatis, cuspidato-acuminatis, inæqualiter serratis v. crenato-dentatis, subæquilateralibus v. obliquis, utrinque puberulis, subtus ad nervos venasque hirtis: summorum petiolis laminâ subæquilongis vel triplo usque brevioribus; pedunculis 3-7-floris; nuce turbinatâ, v. pyriformi, v. obovatâ, v. ovatâ, v. ellipsoideâ, umberatâ, v. acuminatâ, velutinâ, v. incano-puberulâ.—*Tilia mollis*, Spach,* —*T. platyphylla*, Scopol. Carn.—Vent. Diss. t. 1. f. 2. Duham. ed. nov. l. t. 50.—*T. cordata*, Mill. Dict.—*T. cordifolia*, Bess. Gal.—*T. europæa*, Desfont. Cat. Hort. Par. Hook. Fl. Lond. t. 190. E. Bot. Suppl. t. 2520.—*T. pauciflora*, Hayn. Arzn. iii. t. 48. Guimp. et Hayn. Deutsch. Holz. t. 108.—*T. corallina*, Ait. Hort. Kew.—*T. rubra*, DeC. Prodr.—*T. corinthiaca*, Bosc. Nouv. Cours d'Agricul.

Præ cæteris ferè innumeris varietatibus forsanque hybridis hujus speciei sequentes facilius agnoscendæ:—

Var. α . *vulgaris* (*T. platyphyllus*, Vent. l. c. Duham. l. c.)—*T. pauciflora*, Hayn. Guimp. et Hayn. l. c.)—Foliorum superiorum lamina petiolo 2-3-plo longiore; pedunculis 2-3-floris; pedicellis bracteam subsessilem basi rotundatam superantibus; nucibus velutinis vel incanis, turbinatis, plerumque æquilateralibus.—Forma videtur in sylvis vulgatissima. (V. v. c.)

Var. β . *pluriflora*.—Foliorum superiorum laminâ petiolo vix dimidio longiore, basi plerumque truncatâ, obliquissimâ; pedunculis 5-7-floris; pedicellis divaricatis, bracteam lanceolato-ligulatam a pedunculi basi distantem vix superantibus vel subæquantibus; nucibus turbinatis, sæpè obliquis, velutinis.—Transitum sistit a precedente in sequentem. (V. v. c.)

Var. γ . *longepetiolata*.—Foliorum superiorum laminâ petiolo subæquilongâ vel paulo breviore, basi inæqualiter truncatâ; pedunculis 5-7-floris; pedicellis divaricatis, bracteâ lanceolato-ligulari a basi

* De synonymis antiquioribus nullum accepimus, quia omnia formas nonnisi variabiles speciei designant.

pedunculi distante superatis; nucibus turbinatis, velutinis, sæpè obliquis. (V. v. c.)

Var. δ . *bracteosa*.—Foliorum superiorum laminâ petiolo subæquilonâ vel dimidio longiore, ovatâ v. cordatâ; pedunculis 3–5-floris; pedicellis divaricatis, bracteâ lanceolato-ligulari a basi pedunculi distante longe superatis; nucibus obovatis, subacuminatis, incanis, sæpè obliquis. (V. v. c.)

Var. ϵ . *leptolepis*.—Foliorum superiorum laminâ petiolo paulo longiore, subovatâ, basi obliquè truncatâ v. rotundatâ; pedunculis paucifloris; pedicellis bracteam angustè lanceolatam subsuperantibus; nucibus ellipsoideis, subacutis. (V. v. c.)

Var. ζ . *brevipes*.—Foliorum superiorum laminâ petiolo 2–3-plo longiore, subrotundâ, basi subæqualiter cordatâ; pedunculis 3–5-floris, brevibus; pedicellis bracteâ lanceolato-oblongâ longe superatis; nucibus subglobosis, vel ovatis, v. ellipsoideis, obtusissimis, incanis, æquilateralibus. (V. v. c.)

Var. η . *corallina*. (*T. corallina*, Ait.—*T. europæa*, Hook. l. c.—*T. rubra*, DeC.)—Foliorum superiorum laminâ petiolo longiore; pedunculis 3–7-floris; pedicellis bracteam oblongo-ligularem, latissimam, plerumque sessilem subæquantibus vel paulo superantibus; nucibus globosis vel ovatis, umbonatis (raro acuminatis), tomentoso-velutinis*.—Ramuli annotini nunc per totum annum, nunc hyeme tantum sanguinei, etiam in præcocitatis varietatibus haud raro occurunt.

Varietates α . et η . species forsan duas sistunt distinctas, permultis hybridis hortensibus intricatæ.

Arbor 60–100-pedalis, diametro 2–3-pedali. Cortex vetustus griseo-fuscus, rimosus. Rami cinerei, verrucosi, arrecti. Coma ovalis vel subpyramidalis. Ramuli annotini olivacei, vel lutei, vel virides, vel sanguinei, v. violacei, punctati. Ramuli juniores pilis patentibus hirti. Gemmæ ovatæ, obtusæ, fuscescentes. Foliorum lamina 1–4 pollices longa (surculorum sterilium folia nonnunquam semipedalia), nunc totidem lata, nunc longitudine angustior, supra subrugosa, lætè vel obscurè viridis, subtùs pallidè virens sæpeque lucida, basi 5–v. 7-nervis, serrature vel crenule plus minusve approximatæ, mucrone brevi albido subcartilagineo apice sphacelato acuminatæ; petiolus $\frac{1}{2}$ –3 pollices longus, hirsutus v. velutinus, simul ac axillæ, costa, nervi venæque paginæ inferioris pilis mollibus patulis hirti v. hirsuti. Bracteæ foliorum longitudine, vel paulo breviores aut longiores, 3–8 lineas latae, liguliformes, v. lanceolatae, v. lanceolato-oblongæ, obtusæ vel acutæ. Pedicelli divaricati plus minusve arrecti, nunc pedunculi parte liberâ longiores, nunc breviores, plerumque bracteâ paulo superati, umbellati v. corymbosi, v. subtrichotome cymosi. Sepala ovato-lanceolata, obtusiuscula, dorso glabrescentia, facie marginibusque sericea, $2\frac{1}{2}$ –3 lineas longa, pallide lutea. Petala 3–4 lineas longa,

* Nuces juniores quasi ecostatæ videntur (talesque tribuuntur ab illustr. DeCandolle *Tiliae* suæ *rubræ*), tunc costæ, demùm prominentissimæ, tomento denso velantur.

straminea, spathulato- v. obovato-oblonga, obtusa, integerrima, vel apicem versus obsolete crenulata. Stamina 30-45 : filamenta libera v. pentadelpha, ovarium sericeum vel tomentosum. Stylus glaber vel basi barbatus, post anthesin 2 lineas longus. Stigmata obtusa, demum sæpè patentia. Nux 2-4 lineas alta, diametro $\frac{1}{2}$ -3-lineari ; costæ plus minusve prominentes, sæpissime crassæ. Semen ovatum v. obovatum, fusco-castaneum.

Habitat in Europâ, præsertim mediâ et australiori. Parisiis florescit medio Junio : individua tamen reperiuntur singula jam initio Junii vel tantum initio Julii florida.

LIII.—*General Features of Chusan, with remarks on the Flora and Fauna of that Island.* By THEODORE CANTOR, M.D., Bengal Medical Service, &c.

[Continued from p. 370.]

Animals observed at Chusan.

1. MAMMALIA.

CHEIROPTERA.

**Vesperilio irretitus*†. V. auriculis capite brevioribus, rotundatis ; trago lanceolato ; rostro brevi, obtuso, nigro ; labiis mentoque crini- bus longioribus sparsim tectis ; vellere dorsi capitisque molli, brevi, griseo-brunnescenti, abdominis pulvericolore ; membro virili maximo ; caudâ corpus longitudine aequante, e membranâ interfemorali, subtùs sparsim hirsutâ, paululum exsertâ.

Ears rounded, shorter than the head ; tragus lanceolate ; muzzle short, obtuse, black, the lips and chin with scattered, lengthy, bristly hairs ; fur of the back and head short, soft brownish gray, that of the abdomen dust-coloured ; male genital organ highly developed ; tail as long as the body, slightly protruding from the interfemoral membrane, the abdominal surface of which is thinly covered with short hair.

Dentition :—Incis. $\frac{2-2}{3-3}$; canin. $\frac{1-1}{1-1}$; molar. $\frac{4-4}{5-5}$.

DIMENSIONS.	inch.	lin.
Length of the head	$\frac{1}{2}$	0
body	$1\frac{1}{2}$	1
tail	1	1
ear	0	$2\frac{1}{2}$
Breadth of the ear	0	2
Length of the tragus	0	1
Extent of the wings	8	0

* Animals marked with an asterisk have been sketched at Chusan in 1840 by Dr. Cantor, who has supplied the names unless otherwise observed.

† *Irretire*, from its being frequently arrested in the strong web of two large spiders, *Epeira bilineata* and *heraldica* (vide infra), which circumstance has given rise to the common erroneous belief that those and similar spiders feed upon bats.